

Solving Quadratic Equations (by Factoring)

Name: _____

When we are asked to **“SOLVE”** a quadratic equation such as $ax^2 + bx + c = 0$ this means finding the **“x-intercepts or zeros”** of the quadratic relation

$y = ax^2 + bx + c$. The x-intercepts are also called the **“roots”** of the equation.

There are three possible results when solving a quadratic equation:

1. Two distinct roots.
2. Two equal roots.
3. No real roots.

Zero-Product Property: If the product of two numbers is zero, then one or both of the numbers must be zero. That is if $a \times b = 0$, then $a=0$ or $b = 0$

We can use **FACTORING** and the zero product property to solve quadratic equations.

- STEPS:**
1. Make sure equation is in the form $ax^2 + bx + c = 0$
 2. Factor the equation.
 3. Use the zero product property to find the roots by making each factor equal to zero.
 4. Check your solutions - one may be inadmissible if it is a word problem.

EX: Solve by Factoring:

A. $x^2 - 2x - 15 = 0$

B. $x^2 = 49$

C. $5x^2 - 4x = 0$

D. $4x^2 - 12x + 9 = 0$

E. $(3x - 7)(x - 2) = x^2 - 1$

Application Word Problems

EX: Create the quadratic equation to solve the problem by (but do not solve).

A. The width of a rectangle is 2m less than the length. The area of the rectangle is $48m^2$. Find the dimensions of the rectangle.

B. The hypotenuse of a right triangle is 28cm. The sum of the length of the other two sides is 12cm. Find the two unknown sides lengths.